TABLE C-1-4

COPC INTAKE FROM FISH

(Page 1 of 4)

Description

This equation calculates the daily intake of COPCs from the ingestion of fish. Consumption rates were derived from the *Exposure Factors Handbook* (U.S. EPA 1997). U.S. EPA (1997) presents consumption rates based on body weight; therefore, body weight is not included as a variable in the calculation of I_{fish}.

The limitations and uncertainty introduced in calculating this value include the following:

(1) The amount of fish intake is assumed to be constant and representative of the exposed population. This assumption may under- or overestimate I_{fish}.
(2) The standard assumptions regarding period exposed may not be representative of any actual exposure situation. This assumption may under- or overestimate I_{fish}.

Equation

$$I_{fish} = C_{fish} \cdot CR_{fish} \cdot F_{fish}$$

Variable	Description	Units	Value
I_{fish}	Daily intake of COPC from fish	mg/kg-day	
C_{fish}	Concentration in fish	mg/kg	**Varies** This variable is COPC- and site-specific, and is calculated by using the equations in Tables B-4-26 through B-4-28; the fish concentration will vary for each water body. The following uncertainty is associated with this variable: The methodology does not account for concentration variations across fish species. Different species may accumulate COPCs to different extents depending, for example, on their feeding habits and fat content. This may cause C_{fish} to be under- or overestimated.

TABLE C-1-4

COPC INTAKE FROM FISH

(Page 2 of 4)

Variable	Description	Units	Value
CR_{fish}	Consumption rate of fish	kg/kg-day FW	**Varies** The consumption rate varies for the receptor considered. The following home produced or caught ingestion rates for fish were derived from U.S. EPA (1997): Receptor — Ingestion Rate (kg/kg-day FW) Adult — 0.00117 Child — 0.000759 Ingestion rates were determined from U.S. EPA (1997) Table 13-23. The ingestion rates listed in U.S. EPA (1997) were derived from the 1987-1988 USDA National Food Consumption Survey and may be used to assess exposure to contaminants in foods grown, raised, or caught at a specific site. Prior to the adjustment for cooking and preparation loss, the mean individual fish consumption rates were weighted by age group. The ingestion rates were then adjusted for cooking and preparation loss as recommended in U.S. EPA (1997). The total preparation and cooking loss for fish was 38 percent. In addition, ingestion rates for the child receptor represent a time-weighted mean from the respective tables. Where data for a specific age group was incomplete, the intake was extrapolated using data from the general population (Table 10-46 of U.S. EPA 1997). Specifically, an age-group home produced item intake was derived by multiplying the total mean intake for that home produced item by the ration of the item- and age-group general population intake rate (Table 10-46 of U.S. EPA 1997) to a total individual general population intake rate for that item (Tables 10-46 of U.S. EPA 1997). For example: Child (01-02) home produced fish intake rate = [2.07 g/kg-day (Table 13-23)] x 67 g/day (Table 10-46) / 117 g/day (Table 10-46) This value was then included in the determination of a time weighted average and subsequently adjusted for cooking and preparation loss. Uncertainties introduced by assumptions made to calculate this value include the following: (1) The intake rates presented do not take into account the types of fish that will be present in the water body. Separate intake rates are needed for freshwater and estuarine fish and shellfish, depending on the nature of the local surface water body. This assumption can overestimate or underestimate CR_{fish}.

TABLE C-1-4

COPC INTAKE FROM FISH

(Page 3 of 4)

Variable	Description	Units	Value
CR_{fish} *continued*	Consumption rate of fish	kg/kg-day FW	(2) These intake rates do not represent long behavior patterns, which is the focus of the exposure assessments used to support chronic health effects. This introduces uncertainty into the estimates of medians and other percentiles. This assumption can overestimate or underestimate CR_{fish}. (3) The intake rates represent total intake rates of home-caught fish. Where use of site-specific information would reveal the amount of fish consumed from waters within the study area, this information should be used. This assumption can overestimate or underestimate CR_{fish}.
F_{fish}	Fraction of fish that is contaminated	unitless	**1.0** U.S. EPA OSW recommends that this default value be used if site-specific information is not available. The contaminated fraction will vary with each exposure scenario; however, NC DEHNR (1997) and U.S. EPA (1994) assume that this value equals 1.0 for the subsistence fisher. The following uncertainty is associated with this variable: Using 1.0 as a default value for fraction of fish that is contaminated assumes that receptors consume only contaminated fish; this assumption may overestimate F_{fish}.

TABLE C-1-4

COPC INTAKE FROM FISH

(Page 4 of 4)

REFERENCES AND DISCUSSION

NC DEHNR. 1997. *NC DEHNR Protocol for Performing Indirect Exposure Risk Assessments for Hazardous Waste Combustion Units*. January.

This document is one of the reference source documents for the equation in Table C-1-4.

U.S. EPA. 1994. *Revised Draft Guidance for Performing Screening Level Risk Analyses at Combustion Facilities Burning Hazardous Wastes. Attachment C, Draft Exposure Assessment Guidance for RCRA Hazardous Waste Combustion Facilities*. Office of Emergency and Remedial Response. Office of Solid Waste. December 14.

This document is one of the reference source documents for the equation in Table C-1-4.

U.S. EPA. 1997. *Exposure Factors Handbook*. Office of Research and Development. EPA/600/P-95/002F. August.

This document is the source for home-caught fish consumption rates.